MISSOURI DEPARTMENT OF TRANSPORTATION
MATERIALS ENGINEERING
Jefferson City, Missouri

Test Method
MoDOT T45
DETERMINATION OF DRY FILM COATING THICKNESS USING MAGNETIC TYPE GAUGES

1.0 SCOPE

This method describes the procedures for determining dry film coating thicknesses measured by magnetic type gauges used for inspection of shop and field painting.

2.0 APPARATUS

2.1 Magnetic Gauge (Type 1, Pull-off). The gauge shall consist of a permanent magnet attached to a horizontal lever arm which is attached to a helical spring ("banana" gauge) and shall have a reading range with either a maximum of 25 mils or 40 mils, i.e., a 0-25 or 0-40 range would be acceptable. Increasing force is applied to the magnet by turning a graduated dial that coils the helical spring until the magnet breaks contact with the surface.

2.2 Calibration Standard Set (1.5-8 mils), National Bureau of Standards SRM 1362a.

3.0 PROCEDURE

Dry film paint thickness, shop or field painted, shall be measured by a calibrated magnetic gauge on a random basis to represent all the painted area on both sides of the member. The magnetic gauge is to be operated and calibrated in accordance with Steel Structures Painting Council SSPC-PA 2-82, Sec. 2.2. It is especially important that gauge readings be obtained only on completely cured paint. If the paint is not completely cured, the probe of the magnetic gauge will indent into the film and give incorrect readings.

3.1 Shop Painting.

3.1.1 The condition of the substrate surface prior to painting will affect the dry film paint thickness readings when determined by the magnetic gauge. To determine this effect or a correction factor, the following procedure, a modification of SSPC-PA 2-82, shall be used:

3.1.1.1 Measure (A), the bare substrate at a minimum of 10 locations per side of each bridge beam (proportional frequency for smaller items) to obtain a representative average value.

3.1.1.2 Measure (B), the dry paint film at the same frequency as measurement (A) was taken.

3.1.1.3 Correct the (A) and (B) gauge readings or averages as determined by calibration of the magnetic gauge.

3.1.1.4 Subtract the corrected readings (A) from (B) to obtain the thickness of the paint above the original surface. When obtaining readings of the bare metal substrate as described in paragraph 3.1.1.1 above, it has been found that small metal particles will be attracted to and lodge around the probe of the gauge. This may cause incorrect and misleading readings by the gauge.

3.1.2 Random gauge readings shall be obtained at a rate of not less than one for approximately each 20 square feet. Gauge readings should be taken at the rate of approximately two per square foot of contact area and one per linear foot of inaccessible surface. This frequency may be adjusted to special plant conditions such as unusually large or small beams and large inaccessible areas.

3.1.3 The inspector shall take care in the inspection of critical areas which are in contact with high strength and machine bolted connections and areas that will be inaccessible after assembly to insure that the specified thickness is maintained.

3.2 Field Painting.

The inspector shall obtain random gauge readings over the entire shop coat painted surface. If more than one field coat is required, random gauge readings shall also be obtained over the entire painted surface prior to applying the finish coat. These readings may be used together with any calibration corrections to correct the readings on the following field coats so the actual thickness can be determined. If the first coat is also field applied, the procedures outlined in paragraph 3.1 shall be used. Each coat of paint must be as thick as specified regardless of the thickness of the preceding coats.